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EXCISE

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NEW YORK, N.Y. 10005

October 30, 1979

CONFIDENTIAL

Dear Mr. Secretary:

I am just back from Germany and I thought it might be helpful if I sent you a memo of my conversations with Chancellor Helmut Schmidt in Bonn on October 25th. The circumstances under which I had this meeting are set forth in the memo. As there are references in it to the attitudes of other countries, I think it well to treat it confidentially.

I gave an oral summary of my talk to the Embassy in Bonn, but this may include some comments which I may not have given the Embassy. I am aware that this includes very little information of which you are not already aware, but I hope it may prove helpful.

Sincerely,

Jack

Enclosure

Honorable Cyrus R. Vance
Secretary of State
Department of State
Washington, D. C. 20520

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REVIEWED BY <i>Raji</i>	DATE <i>4/1/85</i>
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Interview with Chancellor Helmut Schmidt at his Bonn Office on October 25, 1979 at 12:30 p.m. lasting about two hours -- Eric Warburg, a close Hamburg friend, was present and no one else beyond myself

CIRCUMSTANCES: I had been visiting my grandchildren in Munich where Mr. Warburg called me to say that the Bundeskanzler had expressed a desire to see me as he wanted to talk to me as an old friend about some things which were troubling him in regard to the oncoming NATO decisions and general U.S.G. and F.R.G. relations. I advised him I would be prepared to stay over a day and come up to Bonn to see him if he wished. He set the time and place of meeting. He was cordial, informal and, as usual, frank. I said I was prepared to answer any questions on which I felt sufficiently informed to do so. I commenced the conversation by saying that I thought we were at a rather sensitive period so far as German-U.S. relations were concerned what with SALT, Cuba, Brezhnev's offer in regard to withdrawals, the state of political affairs in the U.S., the attitudes in NATO and the state of the dollar. I told him I had recently seen the President both in regard to SALT and Cuba and if he wished, I could give him my personal impressions of where we stood in regard to both.

In regard to SALT, I said that my last reading, which Mr. Lloyd Cutler had given me, made me feel that it would be ratified provided there were no new untoward

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developments before the vote was taken. We had gotten by Cuba with what I considered to be a rather false note over the "combat team" issue.

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I told him that as a private citizen, I held the view that we might be overdoing the importance of SALT though I had testified in favor of it. We could live, in my judgment, with or without SALT, but I could readily understand that he might encounter some real difficulties or complications if SALT were not ratified.

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My chief concern was that, as things now stood, it was of the utmost importance that we confront the Soviets with a united front on the coming issues; that a solid united front was worth probably 250 missiles and that it was going to be the test of our statesmanship to arrive at such a position without the bickering which the Soviets would be delighted to see developing between us and Western Europe.

I pointed out that the Wehner faction seemed to be placing much greater emphasis on the need for accommodation with the Soviets. I said that Germany had because of its geography been traditionally torn between a "Drang Nach Osten" and a "Drang Nach Westen". This dichotomy might well emerge again to interfere with a clear cut position. It was important, I felt, to guard against any uncoupling of the Alliance from whatever direction the forces might come. Each side had to bear this in mind.

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1. The improvement of attacking ability of an nuclear weapons system has changed for the better on the attacking side. However, the U. S. is pursuing the strategy of not permitting the other side to have the ability to deal the first attack, in return for its not having the ability of the first attack (ability of delivering a forestalling attack on the other side and of deproving the other side of its ability to resort to an attack in retaliation). Even after the U. S. is dealt the first attack, it must check a deliberate nuclear attack against the U. S. or its allies, by maintaining highly dependable ability to inflict unbearable damage on an invader.

Therefore, in response to a tendency to strengthen striking power, security of positive attacking ability becomes a question. An increase in a number of positive attacking ability becomes a question. An increase in a number of firing missiles does not only mean an increase in the first attack ability, but this will be very expensive, and therefore, this is not desirable. This is unstable and also provocative. Besides, the other side is improving its attacking power at such a quick tempo that it is not effective to strengthen underground sheltering facilities and defend its own nuclear attack ability; this is not economical, either. In short, it will be economical to defend ICBM's, which are defended underground, by an ABM system. In parallel with this, strengthening of multi-faceted war-heads is being pushed in order to increase the number of warheads, without increasing the number of missiles.

2. An ABM system of the U. S. is being considered for the citizens' defense which is limited auxiliarily. It is possible to develop a light ABM system for the protection of U. S. citizens from missile attacks, such as missile attacks to be made by Communist China by mistake, and also other accidental missile attacks. It is not considered that defense has become so advantageous as it is possible to develop an ABM system to protect the U. S. citizens from a nuclear attack from the Soviet Union.

3. Furthermore, it is considered that a light ABM system will be able to increase the value of public pledges which the U. S. has committed to its allied nations, or friendly nations on the U. S. If it is possible to defend the majority of the American citizens for 15 or 20 years from now (not causing a loss of more than one million lives) from Communist China's nuclear attacks calculating from an expected scale and performance of Communist China's nuclear armaments, the U. S. will be able to exercise its nuclear attack ability without fear that the country will suffer damage, and this will certainly increase the confidence of Asian nations in the U. S. nuclear deterrence.

If our country cannot be free from Communist China's nuclear threat unless we are armed with nuclear weapons, a light ABM system can be welcome, However, we may want at the next stage to defend ourselves with an ABM system.

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The question is whether or not we may be able to do so, without lowering the dependability of the U. S. nuclear deterrence.

4. The U. S. decision to develop a light ABM system will not seriously change the balance of power between the U. S. and the Soviet Union and their arms race. The Soviet Union had decided to develop an ABM system on the premise of the situation in 1961 and 1962 when it was not possible to expect today's situation in the development of nuclear techniques. Neither the U. S. nor the Soviet Union considers it is wise to develop ABM systems further for the defense of cities in the future. Also, it is possible to find whether or not the other side has started construction of a high ABM system for the defense of cities. They have surplus ability to watch the other side's moves. Furthermore, there are big differentials in resources, which can be used, and especially, in techniques between the U. S. and the Soviet Union and other nuclear-holding nations. Therefore, it is not possible for the U. S. and the Soviet Union to become so weak as to be attacked by nuclear weapons held by other nuclear-holding nations, and also, they will be able to maintain their positions without being driven into the nuclear arms race which will be accelerated spirally.

From 1961 to 1967, the nuclear strategic setup of the U. S. has seen marked improvement, but the amount of budget for it was reduced by one third, on the contrary. If the cost for an ABM system increases to some extent, a spiral nuclear arms race will not possibly start. Judging from the present situation of resources and techniques of the U. S. and the Soviet Union, it will not be possible for either of the two to surpass the other side decisively. At present, the U. S. and the Soviet Union respectively have the ability to launch about 4,000 and about 1,000 warheads against the other side, respectively. However, the two countries are in an equal position in that either of them has the ability to deal the first attack.

Partial orbital bombs of the Soviet Union cannot either upset this relationship. Their rate of hits is low, and the weight of warheads to be loaded is also limited. They are not suitable for destroying an ICBM and they are wasteful for attacking cities. They are suitable for attacking airports, but it will cost too much to destroy 40 airports in the U. S. Interception will also become possible. They are not worthy, for the U. S., of having them. The U. S.-Soviet arms race can be permissible when prospects for nuclear disarmament are dark, so long as it is continued in not a dangerous situation. The problem lies in that no one can guarantee that the race can be withheld with the permissible scope.

5. The trend of technical development of nuclear weapons has widened the distance between the U. S. and the Soviet Union which are the nuclear-holding big powers, and other nuclear-holding nations. This tendency has sharpened the sense of powerlessness of non-nuclear holding nations and checked them from approaching nuclear weapons. On the other hand, it is also difficult to pursue the dignity of nations, which do not have nuclear weapons, and wipe out their anxiety. However, the grim reality which we should realize is that it is not

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possible to secure absolutely positive nuclear security, by either of our having nuclear armaments, or regional multi-faceted nuclear armaments, or by dependence on the U. S. nuclear deterrence. Relatively, it is far better to come under the U. S. nuclear deterrence, and we should be contented with it. Also, if we understand that, different from any time in military history, the predominance of nuclear weapons cannot be effectively converted to political control or diplomatic means, it is not necessary for us to be worried that we may lose political independence by depending on the U. S. nuclear deterrence.

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[REDACTED]

I said

that a great many small investors had been shaken out of the market but there was an enormous amount of money about anxious to invest and nowhere for it to go with confidence. Volker was being tested as was Thatcher. There was, he said [REDACTED]

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[REDACTED] I said the U.S. had come through recessions before. He must remember the U.S. was a very young country some 800 years younger than most of the European ones; it was a continent as well as a nation with a great accumulation of resources and talents on which it could face the future with some confidence. It would get its bearings and

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leadership would emerge as it had before. He broke in to say that while he might have questions as to the U.S.'s ability to meet its short-term, relatively small emergencies or even medium-sized ones, he had no doubt as to U.S. ability to meet the long-term major ones.

We talked about the lowered credibility of the American deterrent. I said I heard this on all sides in Europe -- a good bit of it apparently aroused by Kissinger's recent comment.

t too much talk about the loss of credibility in our commitment could cause harm just as too much skepticism on our part as to Europe's will to defend itself could increase the danger of uncoupling. I said one could not forget that we had given a powerful earnest of our commitment in NATO by the fact that thirty years after the war we still had a large army stationed in Europe. It was difficult to think of a more eloquent commitment. He quite agreed.

I said I hoped that the December meetings would serve as a new opportunity of restoring full confidence in the vigor of the Alliance. To have the Soviets realize they were facing a thoroughly unified position would be the best guarantee of a constructive program for disarmament and the preservation

of peace. We should make it quite clear that we have no
alternative but to react to their buildup.

The Chantellor then brought up

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The Chancellor expressed great interest in the American political campaign. What did I think of the chances of particular candidates -- I gave him my best estimate stressing the fact that it was very early to be making any predictions. He said our campaigns were too drawn out for everyone's good. I agreed.

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He spoke warmly of the Secretary of State. "I find", he said, "one can always rely on what he says."

I believe the Chancellor may be the key to the united front that is needed. I understand that he is well respected in the NATO group. He is straightforward and quite as good as anyone I know of on the European front. He certainly represents the key European country so far as the

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Soviets are concerned.

On a "need to know" basis, I would not think this memo called for any dissemination beyond the Secretary.

October 30, 1979


John J. McCloy

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Until ABM's appeared, nuclear weapons had been believed to be offensive weapons with no defense. This belief was strengthened when ICBM's to be fired from underground and ballistic missiles to be carried by atomic-powered submarines became capable of being employed. The fact that one could not plan an attack on the other without expecting fatal retaliation gave birth to a kind of military stability between the U. S. and the Soviet Union in the form of a mutual deterrent system.

Therefore, U. S. Defense Secretary MC NAMARA, referring to the ICBM plan and the Polaris missile plan in the so-called Posture Statement in 1965, clarified that the U. S. would not have more than 1,000 Minutemans, 54 Tital 11's, 41 Polaris missile vessels or 656 missiles and 680 B52 strategic bombers as strategic nuclear retaliation power.

The budget for strategic nuclear power showed a continued decline from 1962 until it was reduced to 5,100 million dollars. The budget for 1968, however, has been increased by about one billion dollars. This is to modernize and improve the nuclear offensive power in order to cope with the Soviet Union's ABM deployment. The continuous reduction of the budget for the strategic nuclear offensive power until 1967 was based on the judgment that a mutually deterrent state could be maintained by restricting strategic weapons systems.

ABM's however, become a factor to destroy this mutual deterrent system, because they undermine the foundation of offensive weapons' overwhelming superiority over defensive weapons, which worked as deterrent.

Of course, there is an argument that the combination of ICBM's, offensive weapons, and ABM's, defensive weapons, will give birth to a new, stabilized deterrent system. Such an argument is introduced by Prof. Donald BRENNAN at Massachusetts Institute of Technology in the June issue of the Bulletin of the Atomic Scientists. Take, for instance, that a balance of offensive nuclear weapons is maintained between the U. S. and the USSR when the former has 1,000 ICBM's and the latter 500 ICBM's. If the two countries come to have ABM's, which can shoot down 30 per cent of the ICBM's of the other party, it will mean that the two countries are pitted against each other with 70 per cent of the ICBM's actually possessed. This will not disturb the balance of ICBM's between the two countries. Thus says the argument introduced by Prof. BRENNAN.

Once America, in its overall disarmament plan, proposed that both the U. S. and the Soviet Union should reduce their nuclear weapons at the same rate at each stage of disarmament. The U. S. thought that this form of disarmament could maintain the balance of nuclear weapons between the two countries. If so, the same idea can be applied to a weapons system with ICBM's and ABM's combined.

If the deployment of ABM's has the same effect as to reduce the number of ICBM's in accordance with the rate of deployed ABM's, there will be a new, stabilized

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deterrent system. The situation will be the same as the step-by-step realization of disarmament. This is what has been introduced.

This theory, however, has a serious defect.

We must note the fact that there is a difference between the U. S. and the Soviet Union in the defense power of ABM's and the power for ICBM's to destroy the defense network, and that this power changes as time passes.

In case a deterrent system consists only of offensive weapons, it is easier to discuss their balance between two countries. In case an ICBM attacks a city or an industrial center, it will make no great difference, even if it misses the target by one to five kilometers.

In the case of ICBM's, therefore, decisive factors are the amount, non-frailty and power of the warheads. If America can learn the Soviet Union's ICBM holdings, it will be comparatively easy for America to decide simply on the number of ICBM's to be possessed by America in order to maintain a balance in the weapons between the two countries.

In the case of ABM's, however, numerical calculations cannot be made so easily, because the performance of Soviet ABM's is not known so correctly.

Even if America tries to establish an ABM network to cope with the performance and amount of Soviet ABM's, America does not necessarily know how the Soviet ABM can approach an ICBM (in this case, if the ABM approaches three kilometers to the warhead of the ICBM and explodes its one-megaton H-bomb warhead, it is considered as somewhat effective). Neither has America any means to investigate the number of Soviet ABM's. Therefore, in spite of the above supposition that ABM's can shoot down 30 per cent of the ICBM's, this rate cannot be confirmed. This is a fundamental difference between ABM's and ICBM's. This poses the problem that a balance cannot be accurately calculated.

America announces the performance of its own ABM's comparatively well. If, therefore, the Soviet Union considers that its ABM's are inferior to those of the U. S. in performance, the country can increase the number of its ABM's to some extent in order to maintain a balance. On the other hand, America will investigate the actual deployment of Soviet ABM's by utilizing, for instance, a reconnaissance satellite. If it is judged that America is inferior in number, pressure is sure to be applied for increasing the number of U. S. ABM's. America will be forced to increase their number. Then, the Soviet Union will take some countermeasure. It is certain to take a countermeasure by increasing the number of missiles, whether they may be ICBM's or ABM's. This will be repeated. It can be said, therefore, that there is a big possibility that the deployment of ABM's will trigger a new armaments race.

Furthermore, in case the deterrent system is composed of two kinds of missiles, offensive and defensive, instead of offensive weapons alone, one party can

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increase ICBM's or ABM's freely in order to cope with the other party's increase in ICBM's. This will make the problem more complicated. Moreover, there is another problem in that it is difficult to estimate what power ICBM's have to break through a defensive network. We cannot but think that the two countries' efforts to maintain a balance are likely to cause an armaments race.

True Mutual Understanding Fundamentally Difficult

The only sure method to prevent such an armaments race is for the United States and the Soviet Union to promote mutual understanding as much as possible so that one may not misunderstand the intentions and contents of deployed missiles of the other. In case the deterrent system of deployed ICBM's alone is stabilized, stability was maintained not only by the number of weapons on each side, but also by mutual understanding between the two parties. In order to secure a mutual deterrent system based on the combination of offensive and defensive weapons (ABM's), therefore, mutual understanding between the two countries must be further promoted.

This promotion of mutual understanding, however, has a limit because it is conceivable that the Soviet Union deployed ABM's primarily aiming at securing some superiority over America, though it may have been partly a countermeasure against China.

The world order of nuclear weapons is maintained by America, ranking first, the Soviet Union second and other nuclear powers third and so forth. This forms an international political order. When there was obvious confrontation between the United States and the Soviet Union, so far as confrontation was concerned, a balance was maintained between the two countries or the East and West, and even if the Soviet Union was inferior to the United States in the number of nuclear weapons, there was no need to worry about it from an international political standpoint.

If, however, a U. S. Soviet conciliation structure or the two countries' control system is established, America's superiority will become overwhelming. If the Soviet Union is not necessarily contented with its second position in the world, the country will find it advantageous to shake America's superiority by constantly developing and deploying some new weapons system or other. This is another important reason why the Soviet Union has deployed ABM's.

In order to achieve such an objective, the Soviet Union must judge that it will be advantageous not to clarify the performance of its own ABM's. In other words, the Soviet Union judges that if it does not disclose its intentions, it will raise the country's position in international politics. This poses the problem that mutual understanding has necessarily its own limit.

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When U. S. Defense Secretary MC NAMARA announced a decision on America's ABM deployment at a UPI meeting held in San Francisco on September 18, most of his speech seemed to be directed toward the Soviet Union. It seemed that the objective of his speech was to convey America's intentions to the Soviet Union as fully as possible, though he finally added that it would be a thin ABM deployment against China.

In conclusion, U. S. Defense Secretary MC NAMARA stated that the greatest worry now facing America is that it does not know in detail what intentions the Soviet Union has in deploying ABM's.

It seemed that by this statement he wanted to tell the Soviet Union that America was trying to learn the Soviet intentions. It may be difficult, however, to solve the problem that it is advantageous for the Soviet Union that America cannot fully understand the Soviet intentions in its own ABM deployment. As long as it is judged that this state will continue between the two countries to some extent in the future, we should know that the deterrent system based on ICBM-ABM combination will be constantly shaken and destabilized.

Complicated Influence over Allies

The ABM deployment will not only become a destabilizing factor between the United States and the Soviet Union, but it will also affect American allies' sense of reliance on America and may destabilize its relations with its allies.

America's offensive strategic nuclear power protects both America and its allies from the enemy's attack as deterrent power. It does not matter whether these ICBM's may be in the homeland of America or what sea Polaris submarines may be cruising.

If, however, ABM's are to be deployed thinly in the U. S. homeland, Alaska, Hawaii and other U. S. territory, as is reported, they will serve as protecting the Americans alone and not the peoples of the allies. This will certainly make the allies feel that they are discriminated against. America alone will be protected like a fortress by deterrent weapons both offensive and defensive, while the allies will have no new weapon system deployed to protect the lives of their peoples, though they may be protected by offensive deterrent weapons.

It is natural, therefore, that the opinion should be aired by allies, especially NATO members, that the ABM deployment problem should be studied. In order to cope with it, America may study the deployment of an ABM fleet to protect the allies.

According to the latest information, studies have begun on deploying an ABM fleet, for instance, in the East China Sea or the Japan Sea.

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Thus, an attempt is being made to place the allies under an ABM umbrella. The ABM deployment at sea requires the development of a new-type ABM missile remodeled from the Spartan missile in order to be loaded on a vessel. It is also necessary to develop a high-performance radar small enough to be loaded on a ship. In the case of a ship, its form will adversely affect the functions of the radar. Such a new technical problem must be solved in the future.

This ABM fleet plan is, so to speak, a desk plan. It is to be carried out in the future. It is inconceivable that America is so generous that it is ready to cooperate with its allies in deploying ABM's by leaving its own ABM deployment thin. In the recent nuclear non-proliferation negotiations, America's non-nuclear allies keenly felt a conflict of interests between nuclear and non-nuclear nations. Is it not that they will again feel the same discrimination?

An ABM fleet poses another problem for Japan, because, if the above plan is pushed, it will be necessary for Japan to consult with the U. S. on the plan and Japan's share in it. This may invite a situation running counter to Japan's basic policy followed hithertofore in order to stay away from nuclear weapons as far as possible.

Furthermore, as the planned ABM deployment means strengthening nuclear structures to be established reciprocally and directly between the U. S. and the Soviet Union, passing their allies, it may result in reducing America's allies' sense of reliance on the U. S. nuclear power. It will be no wonder that the same feelings as to have driven France to possess nuclear weapons should be intensified through the strengthening of U. S. - Soviet reciprocal nuclear structures.

In discussing the nuclear proliferation problem, such expressions as vertical and horizontal nuclear proliferation are often used. Vertical nuclear proliferation means that a nuclear power increases offensive nuclear weapons or has now defensive nuclear equipment such as ABM's. Horizontal nuclear proliferation means the proliferation of nuclear weapons among non-nuclear nations. This is the so-called nuclear proliferation. In case vertical nuclear proliferation is left unchecked, a military gap between nuclear and non-nuclear nations will be come widened. As a result, non-nuclear nations will be placed in a ravine among nuclear powers, and they will increasingly lose the sense of security.

The ABM deployment will enlarge the psychological gap between American and its allies, a conflict of interests will increase between nuclear and non-nuclear nations, and a military gap between America and its allies will become larger -- these will reduce the allies' reliance on the U. S. nuclear umbrella.

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Probing the Possibility of Non-Nuclear ABM

KOKUBO

November, 1967 issue

by Makoto ISHII (the Yomiuri's International Situation Survey Association)

In discussions on ABM, the first point to come up in relation to Japan is the fact that "ABM is a nuclear weapon." It is true that both the Spartan and the Sprint, which are the two missiles to be used in the Nike-X system, now being developed by America, and such ABM's as Galosh, which the Soviet Union is now said to be in the process of deploying, are all fitted with nuclear warheads. Especially, it is said that missile-intercepting missiles to be used at ultra-high altitude, use megaton-class hydrogen bomb warheads.

Enemy missiles will come flying in at a speed of 20 mach in the case of ICBM's (20 times the speed of sound; as the speed of ordinary bullets is 3 mach at the most, it is about seven times as fast as ordinary bullets) and even in the case of IRBM's, the speed will be about 12 mach. The flight time needed is about 30 to 40 minutes in the case of ICBM's and a dozen or so minutes in the case of IRBM's [sic]. In order to intercept such enemy missiles, there is no doubt at all that the best way would be to combine a high-speed missile with a nuclear warhead, which has powerful force and a big effective radius.

Then, the next question is whether it will be impossible to intercept missiles unless the intercepting missiles are fitted with nuclear warheads. At the present stage, it is more reliable and also easier to obtain if nuclear warheads are used, and therefore, neither the U.S. nor the Soviet Union is engaging in full-scale development of ABM's with non-nuclear warheads. However, several plans have been reported.

For example, research on a warhead using chemical materials, which will produce powerful heat and which can take the place of nuclear warheads is now being conducted in America (Newsweek, January 2, 1967). At the present time, American ABM plan is a two-stage plan, using Spartans and Sprints. As the third stage, another missile, named Hybex, is being considered. This missile is for use at the very last stage of interception at an altitude of 60 kilometers. In order to intercept a missile at such a high altitude, it is difficult to use a nuclear warhead. It requires a chemical warhead which has no danger of producing lethal fallout.

From a similar way of thinking, the possibility of flying a balloon, containing explosive gas, and destroying enemy warheads by the explosion of this balloon, has been under study from about three years ago. It is said that this will be effective as an ABM and also in intercepting enemy aircraft. (Technology Week, November 14, 1966) It sounds absurdly relaxed to talk about balloons to counter the most ultra-modern weapon of ICBM, but there were also experiments using guns instead of missiles

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to intercept missiles, about five years ago. This was a joint study made by the United States Army and a Canadian University (Air Force Magazine, November, 1963), but the results since then are not known.

There is also the idea of converting the ball bombs now being used by America in Vietnam into an ABM. A ball bomb is about the size of a baseball ball. The outer skin of the ball is about one centimeter thick, and inside it, several hundred small, steel balls, like the balls for pin-ball machines are packed tightly into it. Explosives are also packed into the ball, and when this is detonated, the steel balls are scattered widely, in an area of several ten meters, and will kill human beings and animals. Now, the size of a nuclear warhead is about 1.8 meters to 4.5 meters in length, and the diameter ranges from a little over two meters, in the case of warheads for large-size ICBM's to 75 centimeters in the case of small ones (about the size of Minuteman missiles of America). It will not be possible to destroy such a warhead with balls like those used for pin-ball machines. However, if they were to hit a warhead in the airless outer space, a warhead flying at a speed of 20 mach, it will be possible to damage the heat-resisting material on the surface. In that case, when the warhead re-enters the atmosphere, there is said to be a possibility of its burning itself up. There are also such ideas as blowing up a large amount of sand, in place of balls, thereby creating a "sand cloud" very high in the skies, and rubbing off the protective outside skin on the surface of the warhead, or scattering chemicals in the high altitude and eroding the outside surface of warheads.

Concerning interception with small steel balls, there is the following calculation: In the case of interception with a nuclear warhead, it is said that the effective radius within the atmosphere is a little over the radius of the fire-ball which is created by nuclear explosion. The radius of the fire-ball in the case of 10 kilo-tons is said to be 140 meters, and in the case of 20 kilo-tons, 180 meters. If steel balls are scattered around in place of this fire-ball, the situation is said to be as follows: According to this calculation, the surface space of a semi-sphere with a radius of 200 meters is 252,000 square meters. If the diameter of the warhead is assumed to be 1.5 meters, the cross-section space would be 1.76 square meters. Consequently, if about 150,000 small steel balls are scattered about at equal intervals, at least one of them should logically hit the warhead. The weight of one steel ball of a 6-millimeter diameter is 0.9 grams. Therefore, 150,000 steel balls will weigh a total of 136 kilograms. If 450,000 balls, which is three times the above-mentioned number, were to be scattered, the weight would still be 405 kilograms. Therefore, even with the additional weight of the outside case and other appendages, the total weight could be kept down to about the same weight as a nuclear warhead, that is, within one ton.

In the Soviet Union, it is said that a method called "artificial lightning" is being studied. Of course, it still seems to be at the stage of ex-

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periment within a laboratory, but the principle seems to be to "electrocute" the enemy warhead by artificially releasing electricity at a high altitude. No date on methods or the amount of electricity needed have been released.

This is still a matter for the future, but what all nations are turning their attention to is the laser ballistic missiles defense. The sun and other light, such as electric light, emit light rays of various wave lengths, in all directions. Laser is a device for making a light source emit light rays concentratedly in one direction, and at a certain fixed light wave length. Today, it is being developed for use in measuring distance, communications and minute processing, but it is well known that it could become a "death ray". The question is the emission power of laser. At present, it is generally about five or six kilowatts. However, ever since the success in laser emission in 1960, it is said that the emission power of laser is being increased by one digit every year. If it were to be developed at such a tempo, the emission capacity of laser may possibly be increased to several ten thousand kilowatts within the next several years. The burning up of enemy warheads in a brief second, using this tremendous emission capacity of laser is naturally quite conceivable.

If the intercepting of missiles were to be impossible unless one used nuclear warheads, non-nuclear nations will lose even the possibility of having a system of defense against missile attacks, once the Nuclear Non-Proliferation Treaty is concluded, and this will result in further widening the strategic gap between nuclear and non-nuclear nations. In this respect, the significance of non-nuclear BMD, which, unlike the present ABM, has far less possibility of being converted to attack weapons, should be re-studied.

In the nuclear age, "threat" or "deterrent" when viewed from the reverse side, is made up of "military capacity" multiplied by "state intention." To give one example, China's coming to have ICBM's, that is, military capacity, will become a "threat" even though its "intention" should be very small. Conversely, if its military capacity were zero then, no one would feel it a threat, no matter how big its "intentions."

The "military capacity" mentioned here does not merely mean a completed weapons system, but also includes quite frequently technical levels and industrial facilities which are capable of producing such a system. Nuclear development is not being considered in Japan today, at least under the present situation. However, foreign countries list Japan at the top of potential nuclear nations. That is because the atomic reactor No. 1 at Tokai Village, the Atomic Fuel Corporation's plutonium processing plant, the re-processing plant slated to be completed soon, and Japan's nuclear technology are capable of producing atomic bombs within several years, once such an "intention is decided."

In this sense, Japan's engaging in more research on non-nuclear BMD and its raising its technical level in this field can possibly provide a deterrent, and it is a matter which should be studied more fully.

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